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**Datasheet for the decision
of 13 March 2012**

Case Number: T 1101/09 - 3.2.01
Application Number: 07101180.3
Publication Number: 1777107
IPC: B60R 1/00, G08G 1/16,
H04N 7/18, B60R 11/04,
G06T 7/00, G06T 15/20,
G08G 1/04

Language of the proceedings: EN

Title of invention:

Vehicle surroundings monitoring system and method for
adjusting the same

Applicant:

Panasonic Corporation

Headword:

-

Relevant legal provisions:

RPBA Art. 13(1)

Relevant legal provisions (EPC 1973):

EPC Art. 76(1)

Keyword:

"Extended subject-matter (main request, first auxiliary
request: yes)"
"Admissibility (second auxiliary request: no)"

Decisions cited:

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Catchword:

-



Case Number: T 1101/09 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 13 March 2012

Appellant: Panasonic Corporation
(Applicant) 1006, Oaza Kadoma
Kadoma-shi
Osaka 571-8501 (JP)

Representative: Grünecker, Kinkeldey,
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 17 November 2008
refusing European patent application
No. 07101180.3 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: G. Pricolo
Members: C. Narcisi
T. Karamanli

Summary of Facts and Submissions

I. The European patent application No. 07 101 180.3 was refused by the decision of the Examining Division posted on 17 November 2008. The Examining Division considered that the application failed to meet the requirements of Article 76(1) EPC 1973. Against this decision an appeal was filed by the Applicant on 19 January 2009 and the appeal fee was paid at the same time. The statement of grounds of appeal was filed on 27 March 2009.

II. Oral proceedings took place on 13 March 2012. The Appellant (Applicant) requested that the decision be set aside and that a patent be granted on the basis of the claims according to the main request, filed with the statement of grounds of appeal, or, auxiliarily, on the basis of the claims according to the first auxiliary request, filed on 13 February 2012, or the second auxiliary request, filed during the oral proceedings of 13 March 2012.

Claim 1 of the main request reads as follows:

"A vehicle surroundings monitoring system comprising:

a plurality of cameras, including at least a first and a second camera, for capturing images of surroundings of a vehicle; and

an image processing portion that receives as input images captured by the plurality of cameras, modifies and synthesizes the partial images obtained from these cameras to create a synthesized image that is a virtual

viewpoint image in which the vehicle and its surroundings are arranged in a manner as looked down from above, and being adapted to display the synthesized image on a display device; characterized by,

the first and second cameras are arranged apart from each other by a distance on the vehicle to obtain images from different viewpoints;

the capturing directions of the first and second camera are aligned against each other such that their captured images include common border portions, and these common border portions seen from above are aligned with a straight line connecting both cameras,

wherein in the synthesized image, a first partial image obtained by the first camera and a second partial image obtained by the second camera are arranged adjacent to one another to form a continuous image by synthesizing common or adjacent parts of the scene around the vehicle, and

wherein for a pair of the first camera and the second camera the following alternatives a1)-g2) applies:

a1) the first camera (CA1,CB1) is arranged at the front left end portion of the vehicle facing right obliquely forward, and the second camera (CA2,CB2) is arranged at a left center portion of the vehicle facing left obliquely forward;

a2) the first camera (CA1) is arranged at the front right end portion of the vehicle facing left obliquely

forward, and the second camera (CA2) is arranged at a right center portion of the vehicle facing right obliquely forward;

b1) the first camera (CC2) is arranged at the front left end portion of the vehicle facing left obliquely rearward;; the second camera (CC1) is arranged at the front right end portion of the vehicle facing left obliquely forward,

b2) the first camera (CE1) is arranged at the front right end portion of the vehicle facing right obliquely rearward; the second camera (CE2) is arranged at the front left end portion of the vehicle facing right obliquely forward,

c1) the first camera (CA4) is arranged at the rear left end portion of the vehicle facing right obliquely rearward, and the second camera (CA3) is arranged at a left center portion of the vehicle facing left obliquely rearward;

c2) the first camera (CA4) is arranged at the rear right end portion of the vehicle facing left obliquely rearward, and the second camera (CA3) is arranged at a right center portion of the vehicle facing right obliquely rearward;

d1) the first camera (CD1) is arranged at the rear left end portion of the vehicle facing left obliquely forward, and the second camera (CD2) is arranged at the rear center portion of the vehicle facing left obliquely rearward;

d2) the first camera (CD4) is arranged at the rear right end portion of the vehicle facing right obliquely forward, and the second camera (CD3) is arranged at the rear center portion of the vehicle facing right obliquely rearward;

e1) the first camera (CE2) is arranged at the front left end portion of the vehicle facing right obliquely forward, and the second camera (CE3) is arranged at the rear left end portion of the vehicle facing left obliquely forward;

e2) the first camera (CF1) is arranged at the front right end portion of the vehicle facing left obliquely forward, and the second camera (CF4) is arranged at the rear right end portion of the vehicle facing right obliquely forward;

f1) the first camera (CE3) is arranged at the rear left end portion of the vehicle facing left obliquely forward, and the second camera (CE4) is arranged at the rear right end portion of the vehicle facing left obliquely rearward;

f2) the first camera (CF4) is arranged at the rear right end portion of the vehicle facing right obliquely forward, and the second camera (CF3) is arranged at the rear left end portion of the vehicle facing right obliquely rearward;

g1) the first camera (CF3) is arranged at the rear left end portion of the vehicle facing right obliquely rearward, and the second camera (CF2) is arranged at

the front left end portion of the vehicle facing left obliquely rearward;

g2) the first camera (CE4) is arranged at the rear right end portion of the vehicle facing left obliquely rearward, and the second camera (CE1) is arranged at the front right end portion of the vehicle facing right obliquely rearward."

Claim 1 of the first auxiliary request is identical with claim 1 of the main request, albeit the features a1),a2) and b1),b2) having been deleted.

Claim 1 of the second auxiliary request reads as follows:

"A vehicle surroundings monitoring system comprising:

a plurality of cameras, for capturing images of surroundings of a vehicle; and

an image processing portion that receives as input images captured by the plurality of cameras, synthesizes partial images obtained from these camera images to a synthesized image that is a virtual viewpoint image in which is an image looking down onto a vehicle from above, and displays the synthesized image on a display device;

characterized by,

in the synthesized image partial images according to the plurality of cameras are arranged adjacent, the cameras are installed so that the capturing directions of the cameras capturing partial images and the directions of the borders between partial images

substantially match near the border between partial images

wherein for a pair of the first camera and the second camera the first camera (CC2) is arranged at the front left end portion of the vehicle facing left obliquely rearward; the second camera (CC1) is arranged at the front right end portion of the vehicle facing left obliquely forward, and

the plurality of cameras includes:

a third camera (CF3) arranged at the rear left end portion of the vehicle facing right obliquely rearward; and a fourth camera (CF4) arranged at the rear right end portion of the vehicle facing right obliquely forward, or

wherein for a pair of the first camera and the second camera the first camera (CE1) is arranged at the front right end portion of the vehicle facing right obliquely rearward; the second camera (CE2) is arranged at the front left end portion of the vehicle facing right obliquely forward, and

the plurality of cameras includes:

a third camera (CE4) arranged at the rear right end portion of the vehicle facing left obliquely rearward; and a fourth camera (CE3) arranged at the rear left end portion of the vehicle facing left obliquely forward or

wherein for a pair of the first and second camera the first camera (CD1) is arranged at the rear left end portion of the vehicle facing left obliquely forward, and the second camera (CD2) is arranged at the rear center portion of the vehicle facing left obliquely rearward; and

a third camera (CD4) is arranged at the rear right end portion of the vehicle facing right obliquely forward,

and a fourth camera (CD3) is arranged at the rear center portion of the vehicle facing right obliquely rearward."

III. The Appellant's arguments may be summarized as follows:

Claim 1 of the main request fulfils the requirements of Article 76(1) EPC since the subject-matter of claim 1 of the main request does not extend beyond the content of the earlier European (parent) application No. 02 023 013.2 as filed. From the overall disclosure of the parent application (see published parent application, hereinafter designated as EP-A1) and in particular from its basic inventive concept, as expressed in paragraph [0035], it emerges that the actual number of cameras employed in the monitoring system of the invention is not crucial or essential to the invention. Indeed, the essence of the invention consists in the condition that "near the border between two partial images adjacent to one another, the capturing directions of the cameras for capturing the partial images substantially match the direction of the border" (paragraphs [0035] or [0015]). Moreover, as a further condition, in order that "a blind spot does not occur at the border portion between adjacent camera images in the virtual viewpoint image", "camera images adjacent to one another should overlap one another at their border portion" (see paragraph [0035]). Thus it results clearly and unambiguously from EP-A1 that "the present invention can be regarded as positioning two cameras for capturing partial images arranged adjacent to one another in a synthesized image so that the captured regions of the cameras overlap, and adjusting at least one of the cameras or the image processing

portion so that near the border between the partial images, the capturing direction of each camera substantially matches the direction of the border" (see EP-A1, paragraph [0054]). Therefore the actual configuration and number of cameras depends "on the region of the vehicle surroundings for which safety is to be confirmed" (EP-A1, paragraph [0044]), but the preferred configuration implementing the basic principle of the invention includes in fact only two cameras. This is also confirmed by the specific examples including two or four cameras illustrated in EP-A1, where it is emphasized that the mutual arrangement of each pair of cameras has to satisfy the aforesaid conditions mentioned in paragraph [0035] (see for instance EP-A1, paragraphs [0041], [0060]). Consequently, it appears from the preceding arguments that there is no doubt that the basic configurations including only two cameras as implied by the alternatives c1)-g2) of claim 1 are disclosed in the parent application EP-A1, since these are clearly and unambiguously derived from examples 1 to 4 disclosed in EP-A1, simply by considering each pair of adjacent cameras and account being taken of the corresponding configurations which are symmetrical with respect to the longitudinal axis of the vehicle (see paragraph [0036] of EP-A1).

In claim 1 of the first auxiliary request the features a1)-b2), which were not objected to in the impugned decision, have been deleted in order to avoid any potential overlap with the scope of protection of the parent application which might lead to double patenting. The remaining features c1)-g2) comply with

the requirements of Article 76(1) EPC as already laid out above.

Claim 1 of the second auxiliary request implies three alternatives whose subject-matter is exclusively based on the disclosure of figures 10, 13 and 15 and the related parts of the description in the parent application EP-A1. This request should be admitted to the appeal proceedings since it was filed in response to the communication of the Board annexed to the summons to the oral proceedings. The Appellant did not submit this request at an earlier stage of the procedure, given that it was firmly convinced that an undue restriction of the claim would thereby result and that filing such a request at an earlier stage would have weakened its position. Moreover, claim 1 clearly overcomes the objections based on Article 76(1) EPC raised against claim 1 of the main request, for it is directed to a monitoring system including four cameras based on the aforementioned figures and the description of EP-A1. In view of these reasons claim 1 should be admitted to the appeal proceedings.

Reasons for the Decision

1. The appeal is admissible.
2. The Board considers that claim 1 of the main request contravenes the requirements of Article 76(1) EPC 1973 since features c1) to g2) of claim 1 extend beyond the content of the parent application as filed. The Board concurs with the Appellant's view that the basic principle of the invention as disclosed in the parent

application EP-A1 generally applies to the arrangement of two adjacent cameras in any given configuration and irrespective of the specific number of cameras involved, as this can be inferred for instance from claim 1 of EP-A1. Nevertheless, this fact does not provide by itself a sufficient disclosure of a claim directed to specific configurations of cameras arranged at specific locations on a vehicle. In effect, claim 1 of the main request is directed to specific configurations according to alternatives c1) to g2) of only two cameras disposed on the vehicle at specific locations and having each a specific orientation in relation to the vehicle. Due to its generic wording, such specific indications concerning the cameras are not disclosed in claim 1 of EP-A1. On the other hand, figures 5 to 9 and the related parts of the description, forming the second example of embodiments according to EP-A1, disclose the sole embodiments of the invention including only two cameras and these correspond to alternatives a1) to b2) of claim 1. The Appellant contends that a disclosure of the remaining alternatives c1) to g2) of present claim 1 is provided by the further first, third and fourth examples of EP-A1, including in particular figures 2, 10, 13 and 15. This view is not shared by the Board. Indeed, these figures clearly and unambiguously disclose embodiments of the invention of EP-A1 incorporating the inventive concept according to claim 1 of EP-A1, albeit comprising four cameras disposed in conformity with said inventive concept, instead of two cameras as implied by alternatives c1) to g2) of present claim 1. In particular, as may be inferred from any of figures 2, 10, 13 or 15, the four cameras are disposed on the vehicle at particular locations and with specific

orientations such that any pair of adjacent cameras fulfils said inventive concept, wherein moreover each configuration of cameras has a particular aim. In the configuration of figure 2, for instance, "by using four cameras CA1 to CA4, the surroundings of the vehicle, except for the area on the driver seat side that can be visually confirmed through the window by the driver, can be displayed as an image in which the positional relationships are maintained and in which there are no blind spots" (EP-A1, paragraph [0043]). Further, in the configuration of figure 10, "by using four cameras CD1 to CD4, the entire surroundings of the vehicle, except for the area to the front, can be displayed as an image in which the positional relationships are maintained and in which there are no blind spots" (EP-A1, paragraph [0063]). Similarly, figures 13 and 15 show "a camera installation configuration in which the entire surroundings of a vehicle can be shown without blind spots using four cameras" (EP-A1, paragraph [0065]). Hence, it emerges clearly from the disclosure of EP-A1, that each of the configurations according to figure 2, 10, 13 or 15 achieves the object of providing an image of a predetermined surroundings of a vehicle by means of four cameras. Each of these cameras is obviously indispensable in order to provide the desired image of the vehicle's surroundings, and may thus not be omitted. The Appellant's allegations that omission of suitable pairs of cameras from each of these configurations is disclosed in EP-A1, thus obtaining the configurations according to alternatives c1) to g2), is simply not corroborated by the evidence. None of the passages of EP-A1 cited by the Appellant mentions omitting or switching off respective pairs of cameras in order to obtain the configurations according to alternatives

c1)-g2) of present claim 1. The cited passages (see for instance paragraphs [0041], [0054], [0060], [0061]) in the preferred examples merely stress that each respective pair of adjacent cameras has to meet the aforesaid two conditions (see point III) and consequently these passages cannot provide a support for the claimed subject-matter. The cited passages of a more general nature (see for instance paragraph [0044]) cannot either be regarded as a disclosure of said alternatives c1) to g2), for these passages do not contain any specific information relating to the disposition and the orientation of two adjacent cameras according to said alternatives. Any general statement to the extent that "various configurations other than outlined... are conceivable" (see paragraph [0044]) obviously cannot be considered as a disclosure of specific arrangements of cameras according to alternatives c1) to g2) of claim 1 of the main request. For these reasons Article 76(1) EPC 1973 is infringed.

Since it includes alternatives c1) to g2), on account of the same reasons as set out hereinabove claim 1 of the first auxiliary request likewise contravenes Article 76(1) EPC 1973.

3. The Board, exercising its discretionary power pursuant to Article 13(1) RPBA (Rules of Procedure of the Boards of Appeal), decided not to admit the Appellant's second auxiliary request into the appeal proceedings, having particular regard to the current state of the proceedings and the need for procedural economy. Notably, the wording of claim 1 appears not to impose on the first and the second camera the condition that "the cameras are installed so that the capturing

directions of the cameras capturing partial images and the directions of the borders between partial images substantially match near the border between partial images". In effect, according to the wording of claim 1 this condition appears to apply to "a plurality of cameras", but said first and second cameras appear not to be necessarily part of said plurality of cameras. Moreover, the wording of claim 1 does not exclude the possibility that more than four cameras are arranged on the vehicle. Therefore, it is doubtful whether these features claimed for the first time in the present proceedings are disclosed in the parent application EP-A1.

It follows from this that the amendments in claim 1 according to the second auxiliary request raise new issues regarding the compliance with the requirements of Article 76(1) EPC 1973 in relation to the requests then on file.

However, filing amended claims at such a late stage of appeal proceedings which raise new issues was not appropriate from the point of view of procedural economy.

4. Since none of the requests is allowable, the present appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

A. Vottner

G. Pricolo